

CHAPTER 5 – REQUIREMENTS FOR ONSITE (PRIVATE) RECYCLED WATER SYSTEMS

5.1 DESIGN REQUIREMENTS

5.1.1 Determination of Recycled Water Use

As set forth in the District's "Rules and Regulations for Use of Recycled Water", the District shall determine whether a given service will be furnished with recycled water or potable water. These water quality requirements as set forth in Title 22, Chapter 4 of the California Administrative Code are with the intent of the District to protect the Public Health, and with the availability and/or feasibility of making available recycled water facilities.

5.1.2 Requirements of Recycled Water Facilities Using Temporary Potable Water Service

As set forth in the District's "Rules and Regulations for Recycled Water Service", where recycled water is not immediately available for use when the design area is ready for construction and the District has determined that recycled water will be supplied in the future, the private facilities shall be designated to use recycled water.

The private system shall be designed and constructed to the District's Construction Specifications as set forth herein. Provisions shall be made as directed by the District and these specifications followed to allow for connection to the recycled water facilities when they become available. In the interim, potable water will be supplied to the recycled water facilities through a temporary potable meter connection. Until recycled water is available, potable water rates will be charged as set forth in the District's Rules and Regulations. A backflow prevention assembly acceptable to the State and County Health Department and the District will be required as long as the private facilities are using potable water. All irrigation services, recycled and potable, shall have backflow prevention assemblies. The backflow prevention assembly shall be downstream of the meter and a part of the private facilities. When recycled water becomes available, the owner will make the connection to the private facility after a successful cross connection test and all other requirements are satisfied.

5.1.3 Prohibitions and Limitations

Design of private recycled water facilities shall conform to the following:

- A. The recycled water system shall be separate and independent of any potable water system. Cross connections between potable water facilities and private recycled water facilities are forbidden.
- B. Hose bibs on recycled water systems are forbidden.
- C. Drinking fountains shall be protected from the spray or misting of recycled water (in a manner approved by the District Engineer).
- D. Limit or prevent overspray, run-off or ponding.
- E. Potable and recycled lines are to be separated horizontally by ten feet (10') or by a mowstrip installed according to CMWD requirements.
- F. Recycled water shall not be used for any purpose other than the approved uses as set forth herein.
- G. The system shall be designed to irrigate the designated area within the allowable time periods as set forth herein.

5.1.4 Control of Run-Off and Application Areas

The District encourages new and innovative 'methods of irrigation. The use of drip or subsurface irrigation may prove effective in the reduction of total water consumption and control of unnecessary run-off by containment of the water to the designated area.

In accordance with the requirements of the District's Rules and Regulations for control of run-off and for control of the areas to which recycled water is applied, the design of irrigation systems shall conform to the following:

- A. The private recycled water facilities shall be designed to meet with the peak moisture demand of all plant materials used within the design area. The use of moisture sensors is encouraged.
- B. Private recycled water facilities shall be designed to prevent discharge onto areas not under control of the customer. Appropriate sprinklers shall be used adjacent to roadways and property lines to confine the discharge from sprinklers to the design area.
- C. The design of the private recycled water irrigation facilities shall provide for watering during the periods of minimal use of the service area. This is normally between the hours of 10:00 p.m. and 6:00 a.m. or as directed by the District Engineer. Consideration shall be given to allow a maximum dry out time before the design area will be used by the public.
- D. The total time required to irrigate the design area shall not exceed 8 hours in any 24 hour period. Irrigation systems shall be designed to operate within this time requirement.
- E. Recycled water shall be applied at a rate that does not exceed the infiltration rate of the soil. Where varying soil types are present, the design of the recycled water facilities shall be compatible with the lowest infiltration rate present. Copies of the Developer's soils test reports shall be made available to the District upon request.

5.1.5 Drinking Fountains

Exterior drinking fountains must be shown and called out on the recycled water system plans. If no exterior drinking fountains are present in the design area, it must be specifically stated on the plans that none exist. The potable water line supplying the drinking fountain must have warning tape installed, and shall be so stated on the plans. Drinking fountains must be protected from the direct spray or misting of recycled water either by proper placement of the drinking fountain within the design area or with the use of a covered fountain approved for this purpose.

5.1.6 Guidelines for Recycled Water Use

The following guidelines have been established by the Carlsbad Municipal Water 'District in conjunction with the San Diego County Department of Environmental Health. They are intended to provide the basic parameters for the use of recycled water in landscape irrigation. To operate your system in compliance with these guidelines you must:

- A. Irrigate between the hours of 10:00 p.m. and 6:00 a.m. only. Watering outside this time frame must be done manually with qualified supervisory personnel onsite. No system shall at any time be left unattended during use outside the normal schedule.

- B. Irrigate in a manner that will minimize run-off, pooling and ponding. The application rate shall not exceed the infiltration rate of the soil. Timers must be adjusted so as to be compatible with the lowest soil infiltration rate present. This procedure may be facilitated by the efficient scheduling of the automatic control clocks, (i.e. employing the repeat function to break up the total irrigation time into cycles that will promote maximum soil absorption).
- C. Adjust spray heads to eliminate overspray onto areas not under the control of the customer (pool decks, private patios, streets and sidewalks, etc.).
- D. Monitor and maintain the system to minimize equipment and material failure. Broken sprinkler heads, leaks, unreliable valves, etc., should be repaired as soon as they become apparent.
- E. Educate all maintenance personnel on a continuous basis of the presence of recycled water and the fact that it is not approved for drinking purposes. Given the high turnover rate of employees in the landscape industry, it is important this information be disseminated on a frequent basis.
- F. Obtain prior approval of all proposed changes and modifications to any private facilities. Such changes must be submitted to, and approved by, the District Engineering Office and designed in accordance with District Standards.
- G. An annual cross connection inspection will be done by the Carlsbad Municipal Water District.
- H. An on-site user/supervisor shall be designated in writing. This individual shall be familiar with plumbing systems within the property, with the basic concepts of backflow/cross connection protection, and the specific requirements of a recycled water system. Copies of the designation, with contact phone numbers shall be provided to the San Diego County Department of Health Services and the Carlsbad Municipal Water District.

In Case of Emergency Contact _____ @ _____
 (Fill In)
 or After Hours Contact _____ @ _____

Failure to comply with any or all of the above guidelines will be a violation of the District's Rules and Regulations, and will result in termination of service until the appropriate corrective steps have been taken.

5.1.7 Private Recycled Water Notes

- A. The installation of the irrigation water system shall conform to the regulations for the construction of irrigation water systems within the "CMWD" (Carlsbad Municipal Water District) and the accompanying plans and specifications.
- B. All private constant pressure recycled and potable water mainline piping installed on this project shall be identified in accordance with the "CMWD's" Regulations and the Irrigation Specifications (warning tapes also required).

- C. Constant pressure recycled water piping shall be purple PVC as manufactured by Brownline, Inc. or approved equal.
- D. Marking on the purple colored PVC pipe shall include the following:
- Alertline. Caution Recycled Water, Nominal Pipe Size PVC-1120 Pressure Rating in Pounds per Square Inch at 73 Degrees. ASTM Designations such as 1785, 2241, 2672, 3139. Printing shall be placed continuously on two sides of the pipe.
- E. Warning tapes shall be used on all constant pressure main line piping carrying potable water and recycled water.
- F. Warning tapes shall be a minimum 3 inches wide and shall run continuously for the entire length of all constant pressure mainline piping. The tape shall be attached to the top of the pipe with plastic tape banded around the warning tape and the pipe every 5 feet on center. A second tape shall be installed continually over entire length of pipe 12 inches above the water line.
- G. The Carlsbad Municipal Water District shall be notified seven days prior to the start of construction at (760) 438-2722.
- H. As-built drawings of the sprinkler system must be submitted and approved by the District Engineer prior to final acceptance of this project. Failure to provide the drawings may result in the forfeiture of the contractor's standard retention fees.
- I. All pressure main line piping from the recycled water system shall be installed to maintain 10 feet minimum horizontal separation from all potable water piping. Where recycled and potable water pressure main line piping cross, the recycled water piping shall be installed below the potable water piping in a Class 200 "Alertline" purple colored PVC sleeve which extends a minimum of 10 feet on either side of the potable water piping and provide a minimum vertical clearance of 12 inches. Conventional (white) PVC pipe may be used for sleeving material if it is taped with 3 inch wide purple warning tape which reads "CAUTION RECYCLED WATER".
- J. All recycled water sprinkler control valves shall be tagged with identification tags.
1. Tags shall be weatherproof plastic 3" x 4", purple in color with the words, "WARNING RECYCLED WATER - DO NOT DRINK" imprinted on one side, and "AVISO IMPURA - NO TOMAR" on the other side. Imprinting shall be permanent and black in color.
 2. One tag shall be attached to each valve as follows:
 - a. Attach to valve stem directly or with plastic tie-wrap or
 - b. Attach to solenoid wire directly or with plastic tie-wrap or
 - c. Attach to valve cover with existing valve cover bolt.
- K. Adjust spray heads to eliminate overspray onto areas not under the control of the customer (pool decks, private patios, streets and sidewalk, etc.).

- L. Refer to the irrigation specifications for a detailed description of all irrigation system site observation requirements. Failure to call for the required site observations may result in forfeiture of the contractor's standard retention fees.
- M. Failure to comply with any or all of the above guidelines puts your system in violation of the District's Rules and Regulations and will result in suspension of service until corrective steps have been taken.

5.1.8 Plan Review Processing of Private (Onsite) Recycled Water System Improvement Plans

Prior to preparation of improvement plans, the District, City, and County will require the Developer to prepare a preliminary colored recycled water area use map for review and approval. The plan review process is as follows:

- A. All improvement plans shall be submitted by applicant to the City of Carlsbad Planning Department, and City plan check fees collected.
- B. Two sets of improvement plans with transmittal will be sent by the City Planning Department to the City of Carlsbad Engineering Design Division (any other submittal procedure is unacceptable).
- C. The City of Carlsbad Engineering Design Division will review improvement plans and send plan check improvement plans to the San Diego County Department of Environmental Health.
- D. San Diego County Department of Environmental Health will review plans, make comments, collect initial plan check deposit and return improvement plans to the City of Carlsbad Engineering Design Division.
- E. The City of Carlsbad Engineering Design Division will review and send improvement plans to the City Planning Department.
- F. City Planning Department will review plans and have applicant make all corrections and send mylar signature sheet and redlined plan reviews to the City of Carlsbad Engineering Design Division for signature along with a set of corrected improvement plans.
- G. The City of Carlsbad Engineering Design Division will review set of improvement plans and will sign the mylar sheet. Mylar signature sheet and corrected improvement plan set and redlined plan reviews will be sent to San Diego County Department of Environmental Health.
- H. San Diego County Department of Environmental Health will review the improvement plan set and sign mylar. The mylar signature sheet will be returned to the City of Carlsbad Engineering Design Division (San Diego County Department of Environmental Health shall retain improvement plan set).
- I. The City of Carlsbad Engineering Design Division, upon receipt of mylar, forwards it to the City Planning Department for signature approval.

- J. After all agencies have signed the mylar signature sheet, the developer shall send a complete set of 3 mil reproducible mylars and three (3) sets of signed plans to the Carlsbad Municipal Water District. The Carlsbad Municipal Water District will forward one set to the San Diego County Department of Environmental Health.
- K. Revisions made on the approved plans shall be approved by the San Diego County Department of Environmental Health and the City Engineer (or his designee) and so note on plans prior to implementation in field.

5.1.9 Conversion of Recycled Water to a Potable Water Supply

If due to any reason of system failure or use violations it becomes necessary to convert from a recycled water supply to a potable water supply, it shall be the responsibility of the owner, applicant, or customer to pay for all costs for each conversion, by way of, but not limited to, the following items:

- A. Submit proposed plans to the Carlsbad Municipal Water District and San Diego County Department of Environmental Health
- B. Isolation of the recycled water supply. Service shall be removed and plugged at the District main or abandoned in a manner approved by the District Engineer and the health authority.
- C. All irrigation services, potable and recycled shall have backflow prevention assemblies.
- D. The removal of the special recycled water quick couplers including the replacement of these with approved quick coupler valves for potable water systems.
- E. Notifications to all personnel involved.
- F. The removal of all warning labels.
- G. The installation of all potable water lines, completion of successful cross connection test and to pay any capacity fees due, as provided for in the District's "Rules and Regulations for Water and Recycled Water Service".
- H. Disinfection.

5.2 CONSTRUCTION SPECIFICATIONS

5.2.1 Introduction

- A. It is the intention of these specifications to accomplish the work of installing a sprinkler system which will operate in an efficient and satisfactory manner according to workmanlike standards established for sprinkler operation. Notwithstanding is the fact that these specifications may be deficient in setting forth a complete detailed description for the work to be done. It shall be the responsibility of the contractor to install said sprinkler system in such a manner that it shall operate efficiently.

- B. These specifications cover automatically controlled irrigation systems, including all trenching, backfilling and compacting; sleeves, installation of pipe, valves, irrigation heads, fittings, and all other appurtenances; connections to water services, testing; installation of controllers, electrical connections and wiring; adjustment of systems; necessary accessories as shown on the drawings and specific herein.

5.2.2 General Conditions

A. Requirements

1. All work and materials shall be in accordance with the uniform plumbing code published by the State of California, all state and local codes and regulations. Should the construction documents or instructions be at variance with the aforementioned rules and regulations, notify the Carlsbad Municipal Water District and await their instructions before proceeding with the work effected.
2. **Manufacturer's Directions:** Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturer or articles used in this contract furnish directions covering points not shown in the drawings and specifications.
3. **Manufacturer's Warranties:** Manufacturer's warranties shall not relieve liabilities under guarantee. The Carlsbad Municipal Water District may at this option, require a manufacturer's warranty on any product proposed for use.
4. All work called for on the drawings by notes shall be furnished and installed whether or not specifically mentioned in the specifications. Do not willfully install the sprinkler system as indicated on the drawings when it is obvious in the field that unknown obstructions or grade differences exist that might not have been considered in the engineering, or if discrepancies in the construction details, legend, or specific notes are discovered. All such obstructions or discrepancies shall be brought to the attention of the Carlsbad Municipal Water District in the event this is not done. The Contractor shall assume full responsibility for the necessary revisions.
5. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting and architectural features.

B. Protection from Damage

1. Protect work and materials from damage during construction and storage. PVC pipe and fittings shall be protected from direct sunlight.
2. Assume all responsibility for damage to existing construction and restore to its original condition should damage occur as a result of this work.
3. Contractor shall securely cover openings into system and cover apparatuses, equipment, and appliances both before and after being set in place to prevent obstruction in the pipes and prevent breakage, misuse, or disfigurement of the apparatuses, equipment or appliances.

C. Record Drawings

Record drawings shall be prepared and shall show all changes in the work constituting departures from the original contract drawings including those involving both constant-pressure and intermittent-pressure lines and appurtenances. All conceptual or major design changes, including any changes that may be affected by the requirements of these standard specifications, shall be approved by the District before implementing the change in the construction contract. Failure to receive prior approval may result in termination of service.

Upon completion of each increment of work, all required information and dimensions shall be transferred to the record drawings. Facilities and items to be located and verified on the record drawings shall include the following:

1. POINT OF CONNECTION
2. ROUTING OF SPRINKLER PRESSURE LINES
3. GATE VALVES
4. SPRINKLER CONTROL VALVES
5. QUICK-COUPLING VALVES
6. ROUTING OF CONTROL WIRES
7. OTHER RELATED EQUIPMENT AS SPECIFIED BY THE DISTRICT OR THE OWNER

Changes and dimensions shall be recorded in a legible and workmanlike manner. Record construction drawings shall be maintained at the job site during construction.

The applicant, owner, or customer shall provide two (2) sets of irrigation improvement plans and complete set of as-built reproducible three (3) mil photo mylars.

Prior arrangements must be made with the District if water service is to be provided prior to as-built line submittal. Failure to provide record drawings will result in termination of service.

D. Controller Charts

Controller charts shall be prepared, approved by the District, and placed in the controllers before commencing service. Controller charts prepared as set forth below:

1. Provide two controller charts for each automatic controller showing the area covered by the controller. The chart shall be the maximum size the controller door will allow. One controller chart will be provided to the Carlsbad Municipal Water District.
2. The chart is to be a reduced drawing of the actual as-built system. The line weights and lettering on the original controller chart drawing shall be so drawn that the reduced chart is clearly, readable.
3. The chart shall be a blackline print with a different color used to show area of coverage for each station.
4. When completed and approved, the charts shall be hermetically sealed between two pieces of plastic, each piece being a minimum of ten (10) mils thick.

Failure to provide controller charts will result in termination of service.

E. Controller Access

The District reserves the right to have complete access to the controller clocks for reasons of monitoring and controlling system failures. The applicant, owner, or customer shall provide the District with two sets of all keys necessary for access to the controller clocks within the design area. The keys will then become the property of the District. If the system is converted to a potable water supply as provided for herein, the keys will be returned to the owner. The District is not responsible for loss or damage to any controller.

Failure to provide keys will result in termination of service.

F. Conversion From a Potable to Recycled Water Supply

All irrigation facilities converting from a potable to a recycled water supply shall conform to the District's construction specifications as contained herein, including a successful cross connection test.

The facilities to be converted shall be investigated in detail including review of any record drawings, preparation of required reports, and determinations by the District of measures necessary to bring the system into full compliance with these standard specifications. The applicant, owner, or customer shall pay all costs to convert the system at no cost to the Carlsbad Municipal Water District.

G. Guarantee

All work shall be guaranteed in writing for one (1) year from date of acceptance against all defects in materials, equipment and workmanship. Guarantee shall also cover repair or damage to any part of the premises resulting from leaks or other defects in material, equipment, and workmanship to the satisfaction of the Carlsbad Municipal Water District. Repairs if required shall be done promptly upon notification by project owner's representative, at no cost to the owner or at no cost to the Carlsbad Municipal Water District.

H. Existing Site Conditions

The contractor shall acquaint himself with all site conditions. Should utilities not shown on the plans be found during excavations, contractor shall promptly notify the owner's representative for instructions as to further action. Failure to do so will leave the contractor liable for any and all damages thereto arising from his operations subsequent to discovery of such utilities not shown on the drawings.

5.2.3 Material Specifications

A. Summary

All materials throughout the system shall be new, unused and in perfect condition. Refer to irrigation material legend, notes and detail drawings for specific equipment to be used. Substitutions will only be accepted when approved by the Carlsbad Municipal Water District. Equipment or materials installed or furnished without prior approval of the Carlsbad Municipal Water District may be rejected and the contractor required to remove such materials from the site at his expense.

B. Equipment to be Furnished

Supply as a part of the contract the following tools:

1. Two (2) keys for each automatic controller.

C. PVC Pressure Mainline Pipe and Fittings

All buried private piping in the recycled water system shall be installed with warning tape identifying it as recycled water with the exception of intermittent pressure lines. Intermittent pressure lines (lines on the downstream side of a controller valve that will not be subject to constant pressure) may be excepted as long as it is apparent, due to line size and location as determined solely by the District Engineer or Inspector, that the lines are part of a recycled water sprinkler irrigation system.

Stenciled pipe, as specified below, will be accepted in conjunction with warning tape.

1. Pressure mainline piping for sizes 2" and larger shall be PVC Class 315, and shall be purple.
2. Pipe shall be made from an NSF approved Type 1, Grade 1, PVC compound conforming to ASTM Resin Specifications, "D1784". All pipe must meet requirements as set forth in Federal Specifications PS-22-70, with an Appropriate Standard Dimension (S.D.R) - (Solvent Weld Pipe).
3. Pressure mainline piping for sizes 1½" and smaller shall be PVC Schedule 40 with solvent welded joints, and shall be purple.
4. Pipe shall be made from NSF approved Type 1, Grade 1, PVC compound conforming to the ASTM Resin Specifications "D1785". All pipe must meet requirements as set forth in Federal Specification PS-21-70.
5. PVC solvent-weld fittings shall be Schedule 40, 1-2, 11-1 NSF approved conforming to ASTM Test Procedure D2466.
6. Solvent cement and primer for PVC solvent weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer.
7. All PVC pipe must bear the following markings.
 - a. Manufacturer's Name
 - b. Nominal Pipe Size
 - c. Schedule or Class
 - d. Pressure Rating in P.S.I.
 - e. NSF (National Sanitation Foundation) Approval
 - f. Date of Extrusion
8. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. Schedule and NSF Seal of Approval.

9. All pipe shall have stenciling appearing on both sides of the pipe with the marking "RECYCLED WATER" in $\frac{3}{4}$ " letters repeated every 12 inches.

D. PVC Non-Pressure Lateral Line Piping

1. Non-pressure buried lateral line piping shall be PVC Class 200 with solvent-weld joints, and shall be purple.
2. Pipe shall be made from NSF approved, Type 1, Grade 11 PVC compound conforming to ASTM Specifications "D1784". All pipe must meet requirements set forth in Federal Specification PS-22-70 with an appropriate Standard Dimension Ratio.
3. Except as noted in Paragraph C above, all requirements for non-pressure lateral line pipe and fittings shall be the same as for solvent-weld pressure mainline pipe and fittings, (primer not required).
4. All unsized end run lateral lines shall be $\frac{1}{2}$ " pipe.

E. Potable Water Piping

All PVC potable water piping installed within the same project limits as the private recycled water piping shall be installed in accordance with the uniform plumbing code and all other local governing codes, rules and regulations. The pipe shall be continuously and permanently marked with the manufacturer's name or trademark, nominal size, and schedule or class indicating the pressure rating. In addition, all PVC potable water piping shall be blue or shall be white with blue stenciling appearing on both sides of the pipe with the marking "POTABLE WATER" in $\frac{3}{4}$ " letters repeated every 12 inches, and blue tape identifying it as a potable water line and stating "CAUTION: WATER LINE BURIED BELOW".

F. Warning Tape

The plastic warning tape shall be prepared with silver printing on a purple field having the words, "CAUTION: RECYCLED WATER LINE BELOW". The overall width shall be 3 inches.

Warning tapes shall be installed directly on top of the pipe longitudinally and shall be centered. The warning tape shall be installed continuously for the entire length of the pipe and shall be fastened to each pipe length by plastic tape banded around the pipe with fasteners no more than 5 feet apart. Taping attached to the sections of pipe before laying in the trench shall have flaps sufficient for continuous coverage. All risers between the mainline and control valves shall be installed with warning tape. A second warning tape running continuously above piping to be installed 12 inches above recycled water line.

G. Brass Pipe Fittings

1. Where indicated on the drawings, use red brass screwed pipe conforming to Federal Specification #WW-P-35 1.
2. Fittings shall be red brass conforming to Federal Specifications #WW-P-460.

H. Automatic Controllers

1. Automatic controllers shall be of size and type shown on the plans.
2. Final location of automatic controllers shall be approved by the owner's authorized representative.
3. The 120 volt electrical power to the automatic controllers shall be shown on the plans.

I. Electric Control Valves

Use Rain Bird 100-PES-B/150-PES-B, 200-PES-B electric remote control scrubber valves or Rain Bird 100-PES-B-PRS/150-PES-B-PRS, 200-PES-B-PRS pressure regulating electric remote control scrubber valves. They shall be purple.

J. Electric Control Valve Box

1. Use 10" x 10-1/4" round box for all ball valves, Carson Industries #910-12B with purple bolt cover or approved equal. Extension sleeve shall be PVC-6" minimum size.
2. Use 9 1/2" x 16" x 11" rectangular box for all electrical control valves, Carson Industries 14129-12B with purple bolt down cover or approved equal.

K. Sprinkler Heads

1. All sprinkler heads shall be of the same size, type and deliver the same rate of precipitation with diameter (or radius) of throw pressure, and discharge as shown on the plans and/or specified in these special provisions.
2. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than one-half (1/2") inch size will be permitted in the initial backfill.
3. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn, planting, or other construction is necessary the contractor shall make all required adjustments without cost to the owner.
4. Riser nipples for all sprinkler heads shall be same size as the riser opening in the sprinkler body.

L. Potable Water

1. Potable Water - Quick coupling valves used in potable water systems shall be of the LUG thread type, have brass or yellow vinyl covers as manufactured by Rainbird, Hunter, Buckner or approved equal.
2. Recycled Water - Quick coupling valves used in recycled water systems shall have ACME type threads and purple colored locking covers permanently attached to the valve. Quick coupling valves shall be Nelson No. 7645, Hunter No. HV1004-KL-NP or approved equal.

M. Washdown Hydrants and Other Points of Public Access

All private recycled water facilities shall be restricted from public access so that the general public cannot draw water from the system. Facilities such as washdown hydrants (typically found at tennis courts), blow-off hydrants, blow-offs of strainers, and other such facilities shall be restricted from public access.

N. Warning Labels

The District may require warning labels as approved by the District Engineer to be installed on designated facilities. Facilities such as: controller panels and washdown or blow-off hydrants of water trucks and temporary construction services where designated by the District Engineer or Inspector. The labels will notify that the system contains recycled water that is unsafe to drink.

5.2.4 Methods of Construction

A. Layout

1. All work shall be laid out in accordance with plans and details as shown on the drawings. Locate irrigation apparatuses, equipment, etc. in planted area wherever possible.
2. If minor changes in location are required, or as directed by the owner's representative, work shall be accomplished by the contractor at no additional cost to the owner providing such changes ordered before items of work directly connected to the same area are installed, and providing no additional materials are required.

B. Excavating and Trenching

1. Perform all excavations as required for the installation of the irrigation system. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition, and in a manner satisfactory to the owner's representative.

2. Trenches shall be made wide enough to allow a minimum of two (2) inches between parallel pipe lines. Trenches for pipe lines shall be made of sufficient depths to provide the minimum cover from finished grade as follows:
 - a. 18" cover over mainlines
 - b. 12" cover over PVC lateral lines
 - c. 6" cover over poly tubing lateral lines
 - d. 18" cover over sleeved lines under driveways
3. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to even grade. Trenching excavation shall follow lay out indicated on drawings and as noted.

C. Backfilling

1. The trenches shall not be backfilled until all required tests are performed. Trenches shall not be backfilled until all required observations are performed. Observations include sprinkler heads, all fittings, lateral and mainline pipe, valves, and direct burial wire. Trenches shall be carefully backfilled with the excavated materials approved for backfilling consisting of earth, loam, sandy clay, sand or other approved materials free from large clods of earth or stones.

Backfill in landscaped areas shall be mechanically compacted to a dry density equal to 90% of adjacent undisturbed soil in planted areas. Backfill will conform to adjacent grades without dips, sunken areas, humps, or other surface irregularities.

2. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than one-half (1/2") inch in size will be permitted in the initial backfill.
3. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn or planting, or other construction is necessary, the contractor shall make all required adjustments without cost to the owner.

D. Trenching and Backfill Under Paving

1. Trenches located under areas of paving, asphaltic concrete or concrete will be installed and be backfilled with a sand layer six (6") inches below the pipe and twelve (12") inches above the pipe, and compacted in layers to 95% compaction using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in a firm unyielding condition. All trenches shall be flush with the adjoining grade. The sprinkler irrigation contractor shall set in place, cap and pressure test all piping under paving prior to the paving work.
2. Install no multiple assemblies in plastic lines, provide each assembly with its own outlet.

3. Install all assemblies specified herein in accordance with respective detail. In the absence of detail drawings or specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice with prior approval of the Carlsbad Municipal Water District.
4. Solvent weld PVC pipe fittings using solvents and methods recommended by the manufacturer of pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent. Clean off excess solvent. All welded joints shall be cured at least fifteen (15) minutes before moving or handling and twenty four (24) hours before water is permitted in the pipe. All poly tubing fittings shall be of compression type. Insert fittings are not acceptable. Avoid kinking of poly tubing. Connection between tubing and fittings to be clean and free of dust and dirt.
5. Make all connections with threaded fittings using teflon tape. Take up with light wrench pressure.

E. Automatic Controller

Install as per manufacturer's instructions. Remote control valves shall be connected to controller in numerical sequence as shown on the drawings.

F. High Voltage Wiring for Automatic Controller

1. 120 volt power connection to the automatic controller shall be provided by the irrigation contractor.
2. All electrical work shall conform to local codes, ordinances, and local authorities having jurisdiction.

G. Remote Control Valves

Install where shown on drawings and details. When grouped together, allow at least twelve inches (12") between valves. Install each remote control valve in a separate valve box. Each valve number shall be stenciled on valve box with white epoxy paint or heat branded.

H. Closing of Pipe and Flushing Lines

1. Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe and sprinklers. Leave in place until removal is necessary for the completion of installation.
2. Thoroughly flush out all water lines before installing heads and valves.

I. Sprinkler Heads

1. Install the sprinkler heads as designated on the drawings. Sprinkler heads to be installed in this work shall be equivalent in all respects to those itemized.
2. Spacing of heads shall not exceed the maximum indicated on the drawings. In no case shall the spacing exceed the maximum recommended by the manufacturer.

J. Hydrostatic Test – Open Trench

1. Request the presence of the City of Carlsbad Inspector at least forty eight (48) hours in advance of testing. Test to be accomplished at the expense of the contractor and in the presence of the City of Carlsbad Inspector.
2. Center load piping with small amount of backfill to prevent arching or slipping under pressure. All fittings and couplings to be totally exposed.
3. Apply a continuous and static water pressure when welded plastic joints have cured at least twenty four (24) hours. Mainline to be tested for four (4) hours at 125 P.S.I.
4. Repair leaks resulting from tests, and retest until system meets specified test.

K. Backfilling and Compacting

1. Initial backfill on all lines shall have no foreign matter larger than one-half (1/2") inch in size. Backfill shall be sufficiently damp to permit thorough compaction. Backfill for trenching shall be compacted to dry density equal to 90% of adjacent undisturbed soil and shall conform to adjacent grades, without dips, sunken arcs, humps or other irregularities.
2. Settling of backfilled trenches, which may occur during one year period after final acceptance, shall be repaired by the contractor, including the complete restoration of all damaged planting, paving, or other improvements of any kind, to owner's satisfaction at no additional expense.

L. Temporary Repairs

The owner reserves the right to make temporary repairs as necessary to keep the sprinkler system in operating condition. The exercise of this right by the owner shall not relieve the contractor of his responsibilities under the terms of the guarantee as herein specified.

M. Adjusting the System

Adjust valves, alignment, and coverage of all sprinkler heads if it is determined that adjustment in the irrigation equipment or nozzle changes will provide more adequate coverage. Make all necessary changes prior to planting.

These changes or adjustments shall be made without additional costs. The entire system shall operate properly before any planting operations commence. Eliminate overspray onto walkways or pavings.

N. Maintenance

1. The entire sprinkler irrigation system shall be under automatic operation for a period of seven (7) days prior to any planting.
2. The architect reserves the right to waive or shorten the operation period.

O. Clean-Up

Clean-up shall be done as each portion of work progresses. Refuse and excess dirt shall be removed from the site. All walks and paving shall be swept or washed down. Any damages sustained on the work of others shall be repaired to original conditions.

P. Site Observations

In all cases where observation of the irrigation system is required and/or where portions of the work are specified to be performed under the observation of the Carlsbad Municipal Water District, it will be the sole responsibility of the landscape contractor to notify the Carlsbad Municipal Water District two (2) working days in advance of the time such observations are required.

Failure to call for any one of the observations called for below will constitute immediate stoppage of all performance payment to the contractor.

Observations are required for the following:

1. Upon installation and testing of mainline.
2. Upon installation of lateral lines.
3. A complete operation test of entire system at final observation.

The required maintenance period for the system shall not begin until the final observation has been made and installation approved by the Carlsbad Municipal Water District.

Q. Inspection

The Private Irrigation System shall be inspected by City of Carlsbad Planning Department. Prior to beginning of construction, a preconstruction conference shall be held with Planning Department Inspector.

5.3 OPERATIONAL REQUIREMENTS

The following details for user operational requirements that are use specific, such as for irrigation, are intended as examples of current use practice and are not intended to preclude other approved uses, which may require case-by-case specifications.

5.3.1 Specific Prohibitions

A. Runoff Conditions

Conditions that directly or indirectly cause runoff outside of the approved use area, whether by design, construction practice, or system operation, are prohibited.

B. Ponding Conditions

Conditions that directly or indirectly cause a ponding outside of or within the approved use area, whether by design, construction practice, or system operation, are prohibited. Temporary ponding caused by draining of system is allowed with prior District approval.

C. Direct Overspray Conditions

Any discharge of water directly onto areas other than that within the approved use area are prohibited.

D. Windblown Overspray Conditions

Conditions that directly or indirectly permit windblown spray to pass outside of the approved use area, whether by design, construction practice, or system operation, are prohibited.

E. Unapproved Uses

Use of recycled water for any purposes other than those explicitly approved in the currently effective agreement issued by the Carlsbad Municipal Water District and without the prior knowledge and approval of the District is prohibited.

F. Disposal in Unapproved Areas

Disposal of recycled water for any purposes, including approved uses, in areas other than those explicitly approved in the currently effective Use Permit issued by the District and without the prior knowledge and approval of the District, is strictly prohibited. Discharge of water from flushing or drainage of the recycled system shall be done either at the approved use site and in a manner that does not create ponding or runoff conditions, or to a sanitary sewer manhole, with the approval of the agency responsible for operation of the sanitary sewer. In no case shall the discharge of recycled water to a sanitary sewer cause the sewer to overflow or otherwise create a public health hazard or nuisance.

G. Cross Connections

Cross connections, as defined by the California Administrative Code Title 17, resulting from the use of recycled water or from the physical presence of a recycled water service, whether by design, construction practice, or system operation, are strictly prohibited.

H. Unprotected Drinking Fountains

Any and all drinking fountains located within the approved use area designated by the Use Permit shall be protected by siting and/or a structure from contact with recycled water, whether by direct overspray, windblown overspray or by direct application through irrigation or other approved use. Lack of such protection, whether by design, construction practice, or system operation, is strictly prohibited.

I. Unprotected Public Facilities

Facilities that may be used by the general public, including but not limited to eating areas, eating surfaces, pools, spas, hardscape, and playground equipment, and located within the approved use area designated by the Use Permit, shall be protected by siting and/or a structure from contact with recycled water, whether by windblown overspray or by direct application through irrigation or other approved use. Lack of such protection is prohibited until review and concurrence by the Carlsbad Municipal Water District or on a case-by-case basis.

J. Hose Bibbs

Permanent installation of hose bibbs on any onsite recycled water system is strictly prohibited.

K. Fire Hydrants

Use or installation of fire hydrants on any onsite system that presently operates or is designed to operate with recycled water, regardless of the fire hydrant construction or identification, is subject to specific prior approval by the District on a case-by-case basis.

L. Hours of Operation

Irrigation with recycled water is restricted to the hours between 10:00 p.m. and 6:00 a.m., unless otherwise directed by the District.

5.3.2 Onsite Irrigation Systems

A. Supervision

Onsite irrigation systems at each use area under the user's control shall be under the management of an onsite supervisor designated by the user or the operator and approved by the Carlsbad Municipal Water District. Onsite supervisors shall be responsible for the installation, operation, and maintenance of the irrigation system, enforcement of these Regulations, prevention of potential hazards, cross connections and maintenance of the recycled water system plans in record drawing form. The onsite supervisor, in the event of a contamination to the public potable water supply, shall be responsible for immediate notification of District. The onsite supervisor or his representative shall check all appurtenances on the onsite irrigation system to ensure proper operation.

The onsite supervisor or his representative shall be available during normal working hours at an address listed with the District for the purpose of hosting an inspection tour or for discussing operational aspects of the system. The onsite supervisor shall be able to effectively communicate with District personnel orally and in writing. The onsite supervisor or his representative shall be available via telephone at a number listed with the District for emergency off-hours contact. Where necessary, keys and/or lock combinations shall be issued to the District to provide access upon request.

B. Temporary Service Connection

A temporary service connection may be provided for onsite construction testing purposes. The temporary service connection consists of the meter plus any backflow prevention assembly (ies).

C. Service Startup

Following final District inspection and successful cross connection inspections and/or tests, the user shall request in writing regular service startup. District shall begin regular service within five working days of approval of service startup.

D. Periods of Operation

In order to maintain acceptable working conditions throughout the recycled water system, District may schedule recycled water use. Such scheduling may involve programming deliveries to different users and/or to various portions of a single user's onsite system. Any scheduling shall consider applicable constraints of all involved regulatory agencies, these Regulations, and the operating constraints of the affected users.

District may temporarily terminate recycled water service at any time recycled water at the terminal point of the supply source does not meet the requirements of the regulatory agencies. Recycled water service would, in such case, be restored when the recycled water meets the governing requirements at the terminal point of the supply source. District may provide recycled water service from other approved sources. In addition, approved air gap separations may be used to provide potable water to the recycled water system to ensure water service.

E. Confinement of Irrigation

The user shall be responsible for maintaining and controlling the system in order to minimize human contact and prevent consumption of recycled water and to control and eliminate direct spray, overspray, ponding and runoff. The user shall be responsible for any and all subsequent uses of the recycled water.

F. Pressure Testing (or other accepted alternative)

In order to determine the existence of any cross connections or backflow conditions into the potable water system, the District shall perform a pressure test where the potable and recycled water systems are isolated for a period of 24 hours or a time frame acceptable to the regulatory agency and the Carlsbad Municipal Water District.

G. Contamination

In the event of contamination or pollution of a potable water system due to a cross connection or other failure, the District shall be immediately notified, so that appropriate measures will be taken to correct the problem.

5.3.3 Recycled Water Use at Construction Sites

A. Supervision

The operation and surveillance of the construction water facility at each use area under the user's control shall be under the management of an onsite supervisor designated by the user or the operator and approved by the District. Onsite supervisors shall be responsible for the installation, operation, and maintenance of the onsite facility, equipment, enforcement of these regulations, and prevention of cross connections and potential hazards. The onsite supervisor or his representative shall be available via telephone at numbers listed with the District for contact during working hours and after hours.

B. Application Control

Recycled water used for the purpose of soil compaction and dust control shall not be stored or applied in a manner which causes runoff, ponding or windblown overspray conditions. If such conditions occur, the method of application shall be altered to correct them and prevent any and all further ponding and runoff. Control valves on the water distribution vehicles and other controlling devices shall be properly employed to prevent the application of recycled water outside the approved use area onto surfaces including, but not limited to, street pavements, sidewalks and drainage courses.

C. Periods of Operation

The periods of operation of the construction water facilities, insofar as they depend on the supply of recycled water from the offsite system, shall be subject to regulation by the District in accordance with the needs of the entire recycled water distribution system.

D. Maintenance

A preventive maintenance program designed to ensure the continued operation of all system elements within the requirements of these Regulations shall be evidenced by the user and open to inspection by the District.